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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 90

Application Number: 08/303,561
Filing Date: September 09, 1994
Appellant(s): Johannes G. Bednorz et al.

Daniel P. Morris
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 1/18/2000 (Substitute Brief).

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

Claims 24-26, 86-90, 96-177 are pending.

Claim 136 was allowed at the time of Final Rejection. Claims 114-116, 119-121, 124-126, 132, 133, 137, 138, 143, 144, 146, 148, 152-157, 160-163, 167, 168, 171, 172 and 173 have been subsequently allowed. Reasons for the withdrawal of the previous rejections as they pertain to these claims will appear in section (6)Issues of Rejection of this Examiner's Answer.

Claims 24-26, 88-90, 96-102, 109-113, 129-131, 134, 135, 139-142, 145, 149-151, 158, 159, 164-166, 169-170 and 174-177 remain rejected under 35 U.S.C. 112, first paragraph.

Claims 86, 87, 96-108, 112, 113, 117, 118, 122, 123, 127, 128 and 147 remain rejected under 35 U.S.C. 112, second paragraph.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

Note that an additional complete record of these after-final submissions also appears in Paper #88 (Notification of Non-Compliance mailed 9/13/99). Note also that in appellant's original Brief filed 7/1/99, at page 4, reference is made to an after-final submission filed 12/14/98. In Paper #88 (Notification of Non-Compliance mailed 9/13/99) appellant was requested to clarify the status of the 12/14/98 submission. In the Substituted Brief filed 1/18/00 no reference is made to the 12/14/98 submission. Accordingly, the Examiner believes the record to be complete with respect to after-final submissions as delineated by appellant in the Substitute Brief filed 1/18/00.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows:

Are claims 24-26, 88-90, 96-102, 109-113, 129-131, 134, 135, 139-142, 145, 149-151, 158, 159, 164-166, 169-170 and 174-177 not enabled under 35 U.S.C. 112, first paragraph.

Are claims 86, 87, 96-108, 112, 113, 117, 118, 122, 123, 127, 128 and 147 indefinite under 35 U.S.C. 112, second paragraph.

The prior art rejection over Asahi Shinbum, International Satellite Edition (London), November 28, 1986 (hereinafter, "the Asahi Shinbum article") is withdrawn in view of applicant's remarks.

Upon careful consideration, the examiner agrees with applicant's position appearing at pages 39-44 of the supplemental response filed 8/5/99. Specifically, applicant has sufficiently demonstrated conception, diligence and reduction to practice of the instant invention before the publication date of the Asahi Shinbum article. Applicants have shown that conception of their invention was in the United States at their direction prior to the publication date of the reference. As explicitly stated in Wilson v. Sherts, 81 F2d 755, 28 USPQ 379 (CCPA 1936), "In the case of conception and reduction to practice, it is well settled that the conception must take place in the United States, or in lieu thereof, it must have been brought to this country *or must have been communicated to someone in this country.*". Such has been shown by applicants.

Accordingly, the issue of claims 24-26, 86-90, 96-135 and 137-177 being supported by the priority document is believed moot in view of the withdrawal of the prior art rejections.

(7) Grouping of Claims

The appellant's statement in the brief that certain claims do not stand or fall together is not agreed with because appellant merely states "Each claim is appealed individually" but fails to present any detailed reasoning is support of such a statement.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

No prior art is relied upon by the examiner in the rejection of the claims under appeal.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure commensurate with the scope of the claims.

The present specification is deemed to be enabled only for compositions comprising a transition metal oxide containing at least a) an alkaline earth element and b) a rare-earth element or Group IIIB element. The art of high temperature (above 30°K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases.[1] Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 U.S.C. 112.[2] Merely reciting a desired result does not overcome this failure.[3] In particular, the question arises: Will any layered perovskite material exhibit superconductivity?

It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism still is not understood. Accordingly, there appears to be little factual or theoretical

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[1]See In re Fisher, 166 USPQ 18, 24; and In re Angstadt and Griffen, 190 USPQ 214, 218. See also, In re Colianni, 195 USPQ 150, 153, 154 (CCPA 1977) (J. Rich).

[2]See In re Cook, 169 USPQ 298, 302; and Cosden Oil v. American Hoechst, 214 USPQ 244, 262.

[3]See In re Corkill, 226 USPQ 105, 1009.

basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity. A "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion".[4]

Note that the above 112, first paragraph, rejection has been modified in scope from the Final Office Action. Upon careful consideration of the evidence as a whole, including the specification teachings and examples, and applicant's affidavits and remarks, the examiner has determined that the instant specification is enabled for compositions comprising a transition metal oxide containing an alkaline earth element and a rare-earth or Group IIIB element (as opposed to only compositions comprising $Ba_xLa_{5-x}Cu_5O_y$. as stated in the Final Office action). Applicant has provided guidance throughout the instant specification that various transition metal oxides (such as copper oxide) containing an alkaline earth element and a rare-earth or Group IIIB element result in superconductive compounds which may in turn be utilized in the instantly claimed methods.

Claims 24-26, 88-90, 96-102, 109-113, 129-131, 134, 135, 139-142, 145, 149-151, 158, 159, 164-166, 169-170 and 174-

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[4]See Brenner v. Manson, 383 US 519, 148 USPQ 689.

177 are rejected under 35 U.S.C. § 112, first paragraph, for the reasons set forth in the objection to the specification.

Claims 86, 87, 96-108, 112, 113, 117, 118, 122, 123, 127, 128 and 147 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 86, 87, 96-108, 112, 113, 117, 118, 122, 123, 127, 128 and 147, the terms "layer-type", "perovskite-like", "rare-earth-like" are vague and confusing.

The question arises: What is meant by these terms?

The terms "layer-type" and "perovskite-like" are unclear because the "type" or "like" terms are deemed to be indefinite. Terms such as "like", "similar", and "type" are indefinite.[5] It is suggested that "layer-type perovskite-like crystal structure" be changed -- a substantially layered perovskite crystal structure --.

Note that claims 112, 113, 117, 127 and 128 were not listed in the heading of this rejection in paper #66 (Final Rejection mailed 6/25/98). However, each claim clearly contains the exact

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[5]See Ex parte Remark, 15 USPQ 2d 1498, 1500 (BPAI 1990); Ex parte Kristensen, 10 USPQ 2d 1701, 1703 (BPAI 1989); Ex parte Attig, 7 USPQ 2d 1092, 1093 (BPAI 1988); and Ex parte Copenhaver, 109 USPQ 118 (POBA 1955).

language referred to in the body of the rejection, and claims 112, 113, 117 are specificallyreferenced at page 13 of the Final rejection in the examiner's discussion of the 112, second paragraph rejection. Accordingly, the addition of claims 112, 113, 117, 127 and 128 to the heading of the 112, second paragraph, rejection, is not believed to be a new ground of rejection.

(11) Response to Argument

As discussed above in section 6 Issues, the prior art rejection over Asahi Shinbum, International Satellite Edition (London), November 28, 1986 (hereinafter, "the Asahi Shinbum article") is withdrawn in view of applicant's remarks.

It is believed that the withdrawn of the prior art rejection addresses each of applicant's remarks appearing at pages 7-51 and pages 114-173 of the Substitute Brief filed 1/18/00 (paper #89).

Additionally, as stated in section (10) Grounds of Rejection, note that the above 112, first paragraph, rejection has been modified in scope from the Final Office Action. Upon careful consideration of the evidence as a whole, including the specification teachings and examples, and applicant's affidavits and remarks, the examiner has determined that the instant specification is enabled for compositions comprising a transition

metal oxide containing an alkaline earth element and a rare-earth or Group IIIB element (as opposed to only compositions comprising $Ba_xLa_{5-x}Cu_5O_y$. as stated in the Final Office action). Applicant has provided guidance throughout the instant specification that various transition metal oxides (such as copper oxide) containing an alkaline earth element and a rare-earth or Group IIIB element result in superconductive compounds which may in turn be utilized in the instantly claimed methods.

With respect to the remaining claims rejected under 35 U.S.C. 112, first paragraph, all of appellant's remarks appearing at pages 52-101 of the Substitute Brief have been carefully considered. The following remarks are believed to address each of the issues raised by appellant in the Substitute Brief.

Applicants' arguments filed 1/18/00, as well as the Affidavits filed September 29, 1995, January 3, 1996 (paper nos. 49 and 52), as well as after-final submissions December 15, 1998: (1.132 Declarations of Mitzi, Tsuei, Dinger and Shaw)(Advisory mailed 2/25/99 (Paper 77E)) have been fully considered but they are not deemed to be persuasive.

The additional case law and arguments by the applicants have been duly noted. For the reasons that follow, however, the record as a whole is deemed to support the initial determination

that the originally filed disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed.

The applicants quote several passages from their specification at pp. 13-15 of their September 29, 1995 Amendment, but the issue is the scope of enablement, not support. The present disclosure may or may not provide support for particular embodiments, but the issue here is the scope to which that disclosure would have taught one skilled in the art how to make and use a composition which shows the onset of superconductivity at above 26°K.

Construed in light of that issue, the invention is not deemed to have been fully enabled by the disclosure to the extent presently claimed.

(1) In their September 29, 1995 Amendment, the applicants argue that their disclosure refers to "the composition represented by the formula RE-TM-O, where RE is a rare earth or rare earth-like element, TM is a nonmagnetic transition metal, and O is oxygen", and list several species such as "$La_{2-x}Ba_xCuO_{4-y}$" which they indicate are found in the present disclosure.

(2) Notwithstanding that argument, it still does not follow that the invention is fully enabled for the **scope**

presently claimed. The claims include formulae which are much broader than the RE-TM-O formula cited in the disclosure. Claim 24 recites "a transition metal oxide", claim 88 "a composition", and claim 96 "a copper-oxide compound".

The present specification actually shows that known forms of "a transition metal oxide", "a composition", and "a copper-oxide compound" do **not** show the onset of superconductivity at above 26°K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the applicants state that the prior art includes a "Li-Ti-O system with superconducting onsets as high as 13.7°K." Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, non-conducting CuO phase" at p. 14, line 18.

Accordingly, the present disclosure is not deemed to have been fully enabling with respect to the "transition metal oxide" of claim 24, the "composition" of claim 88, or the "copper-oxide compound" of claim 96.

The examples at p. 18, lines 1-20, of the present specification further substantiates the finding that the invention is not fully enabled for the scope presently claimed.

With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-O form (i.e., "RE-AE-TM-O", per p. 8, line 11) shows

"no superconductivity". With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-O form shows an onset of superconductivity at "T_c = 26°K". It should be noted, however, that **all** of the claims in this application require the critical temperature (T_c) to be "in excess of 26°K" or "greater than 26°K".

The applicants also have submitted three affidavits attesting to the applicants' status as the discoverers of materials that superconduct > 26°K. Each of the affidavits further states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K, such a person of skill in the art, using the techniques described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ...without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art." All three affiants apparently are the employees of the assignee of the present application.

Those affidavits do not set forth particular facts to support the conclusions that all superconductors based on the applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. Conclusory statements in an affidavit or specification do not provide the factual evidence needed for patentability.[6]

Those affidavits do not overcome the non-enablement rejection. The present specification discloses *on its face* that only certain oxide compositions of rare earth, alkaline earth, and transition metals made according to certain steps will superconduct at > 26°K.

Those affidavits are not deemed to shed light on the state of the art and enablement *at the time* the invention was made. One may know *now* of a material that superconducts at more than 26°K, but the affidavits do not establish the existence of that knowledge on the filing date for the present application. Even if the present application "includes all known principles of ceramic fabrication", those affidavits do not establish the level of skill in the ceramic art as of the filing date of that application.

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[6]See In re Lindner, 173 USPQ 356, 358 (CCPA 1972).

It is fully understood that the applicants are the pioneers in high temperature metal oxide superconductivity. The finding remains, nonetheless, that the disclosure is not fully enabling for the scope of the present claims.

The appellants quote a statement from part of the previous Office Action and asserts that the "Examiner does not support this statement with any case law citations." That assertion is incorrect. Seven decisions have been cited as providing the legal basis for this determination of non-enablement.[7]

The appellants further "note that the Examiner seemed to have specifically avoided applying (sic) the case law and, consequently, ... applicants take the Examiner's silence as concurrence in the manner that applicants have applied this case law." Apparently, the appellants are referring to their discussion[8] of the case law previously cited by this Examiner. Notwithstanding the appellants' commentary on case law, the April 15, 1997 Office Action, paper no. 54, sets forth the factual basis for the determination of non-enablement at pp. 5-10.

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[7]See footnotes 1-4 in the April 15, 1996 Office Action, paper no. 54. See also, the corresponding sections of this Office Action.

[8]See pp. 12-25 of the September 29, 1995 Amendment, paper no. 50.

The appellants still further argues "that the Examiner does not rebut the case law and argument provided by applicants on (pages) 15-25 of their September 29, 1995 amendment which addresses (these issues) in detail." The point remains, nevertheless, that there appears to be a concurrence as to the applicable case law. That case law speaks for itself. What has been fully addressed in the previous Office Action and repeated above is the factual basis for the determination of non-enablement for the scope of the present invention.

The appellants argue that their own examples do not support the determination of non-enabling scope of the invention. Nevertheless, the record is viewed as a whole. If the applicants could not show superconductivity with a $T_c > 26°K$ for certain compositions falling within the scope of the present claims, it is unclear how someone else skilled in the art would have been enabled to do so at the time the invention was made.

The appellants assert that "(b)y the Examiner's statement that these (statements in the affidavits) are conclusionary (sic) the Examiner appears to be placing himself up as an expert in the field of superconductivity" and "respectfully request that the Examiner submit an affidavit in the present application rebutting the position taken by applicants' 3 affiants." Notwithstanding those assertions, this Examiner has determined that those

affidavits were insufficient because they were conclusory only, i.e., they lacked particular facts to support the conclusions reached.

The appellants argue that the "Examiner has provided no substantial evidence to support this assertion (of non-enabling scope of the invention). It is respectfully requested that the Examiner support (his) assertion with factual evidence and not unsupported statements." Nevertheless, the determination of non-enabling scope is maintained for the reasons of record.

The appellants argue that the "standard of enablement for a method of use is not the same as the standard of enablement for a composition of matter" and that their claimed invention is enabling because it is directed to a method of use rather than a composition. Basis is not seen for that argument, to the extent that it is understood. It is noted that 35 U.S.C. 112, first paragraph, reads as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Process of use claims also would be subject to the statutory provisions of 35 U.S.C. 112, first paragraph.

The appellants assert that the "Examiner has not shown by evidence not contained within applicants' teaching that the art of high T_c superconductors is unpredictable in view of applicants' teaching" (spelling and punctuation errors corrected). To the extent that the same assertion is understood, the rejection is maintained for the reasons of record.

The appellants point to "Copper Oxide Superconductors" by Charles P. Poole, Jr., et al., (hereinafter, "the Poole article") as supporting their position that higher temperature superconductors were not that difficult to make after their original discovery.

Initially, however, it should be noted that the Poole article was published *after* the priority date presently claimed. As such, it does not provide evidence of the state of the art *at the time* the presently claimed invention was made.

Moreover, the present claims are directed to processes of using metal oxide superconductors, **not** processes of making them. Even if the Poole article provided direct evidence of the state of the art at the time the invention was made, which it apparently does not, that evidence still does not pertain to the

issue at hand, namely, the process of using metal oxide superconductors to conduct electricity under superconducting conditions.

Finally, the Preface states in part at A3: "The unprecedented worldwide effort in superconductivity research that has taken place over the past two years has produced an enormous amount of experimental data on the properties of the copper oxide type materials that exhibit superconductivity above the temperature of liquid nitrogen. ... During this period a consistent experimental description of many of the properties of the principal superconducting compounds such as BiSrCaCuO, LaSrCuO, TlBaCaCuO, and YBaCuO has emerged. ... The field of high-temperature superconductivity is still evolving ..." That preface is deemed to show that the field of high-temperature superconductivity continued to grow, on the basis of on-going basic research, *after* the Bednorz and Meuller article was published.

The applicants submitted three affidavits, one each from Drs. Tsuei, Dinger, and Mitzi which were signed in May of 1998. Except for one change, those three affidavits are the same as the ones submitted before and discussed above.

Those affidavits have been changed to indicate that the present application "includes all known principles of ceramic fabrication known at the time the application was filed." However, that additional indication also is considered to be a conclusory statement unsupported by particular evidence.

Appellants have submitted three affidavits attesting to the applicants' status as the discoverers of materials that superconduct > 26°K. Each of the affidavits states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K, such a person of skill in the art, using the techniques described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ...without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art.

It is the examiner's maintained position that while general principles of ceramic fabrication were most certainly known prior to the filing date of the instant application, the utilization of such techniques to produce superconductive materials within the

scope of the instant claims were not known. The affidavits are not effective to demonstrate enablement *at the time* the invention was made. As stated in paper #66, page 8, one may *now* know of a material that superconducts at more than 26K, but the affidavits do not establish the existence of that knowledge on the filing date of the present application.

It is acknowledged that applicants are pioneers in the filed of high temperature metal oxide superconductivity. The examiner respectfully maintains, for the reasons of record, that the disclosure is not fully enabling for the scope of the present claims.

With respect to the remaining claims rejected under 35 U.S.C. 112, second paragraph, all of appellant's remarks appearing at pages 102-113 of the Substitute Brief have been carefully considered. The following remarks are believed to address each of the issues raised by appellant in the Substitute Brief. Note that the Examiner declines to comment on appellants remarks regarding the after-final submissions which have not been entered or considered by the examiner.

The applicants argue that the terms "rare-earth like", "perovskite-like", and "perovskite-type" are definite. Those arguments are not found to be persuasive.

Each patent application is considered on its own merits. In some contexts it may have been clear in the art to use the term "like", such as when the "like" term is sufficiently defined. In the present case, however, the terms "rare-earth like" and "perovskite-like" are unclear. As suggested above, "rare-earth like" should be changed to -- rare earth or Group IIIB element -- . The terms "like" or "type" also should be removed from "perovskite-like" or "perovskite-type".

This Examiner's Answer is deemed to be a complete discussion of all relevant issues raised by the appellants.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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May 8, 2000

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